

ATTORNEY DOCKET NO. P117-US

REMARKS

Claims 1-97 are pending. Claims 72-91 are allowed. Claims 1-71 are rejected.

The indication of the allowed subject matter is appreciated by the applicants.

Claims 27 and 58 are amended to remove clerical errors therein.

The Examiner rejected independent claim 1 under 35 U.S.C. §102 (b) over Tai (US 6,162,367). It is respectfully submit that claim 1 as amended is not anticipated or suggested by Tai.

Specifically, claim 1 now distinctly recites, among other features, a step of pumping a portion of a gas out from the etching chamber, wherein the gas comprises a portion of the etchant recipe and a portion of an etchant product. This feature is described and supported by the specification as originally filed, for example, in paragraph [0032] of the specification, but is nowhere disclosed or suggested in Tai.

Moreover, claim 1 recites that another portion of the first amount of the etchant recipe is circulated in a circulation loop that passes through the etching chamber during the steps of pumping and providing the second discrete amount of the etchant recipe. This feature is nowhere disclosed or suggested by Tai, because the etching system (e.g. the system illustrated in FIG. 1A) does not provide the circulation loop that passes through the etching chamber and through which the etchant recipe is circulated. In contrast, the etchant of Tai is introduced into the etching chamber (110 in FIG. 1A) and pumped out from the etching chamber 110 by vacuum system 150.

Since Tai fails in teaching or suggesting the combination of features in claim 1, claim 1, as well as claims 2-44 dependent from claim 1, is patentable over Tai. Reconsideration and withdrawal of the rejection are respectfully requested.

The Examiner rejected independent claim 45 under 35 U.S.C. §102 (b) over Tai (US 6,162,367). It is respectfully submit that this rejection is in error, and is respectfully traversed for at least the following reasons.

Claim 45 as originally filed distinctly recites, among other features, a step of circulating the etchant and the diluent gas through the etch chamber. This feature is nowhere disclosed or suggested by Tai. In contrast, the etchant of Tai is introduced into the etching chamber (110 in FIG. 1A) and pumped out from the etching chamber 110 by vacuum system 150. The etchant is not circulated through the etching chamber as

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required by claim 45. However, for placing claim 45, as well as claims 46 to 71 dependent from claim 45, into better condition for allowance, applicants amend claim 45 to expressly point out that the etchant and the diluent gas are circulated through a circulation loop that passes through the etch chamber.

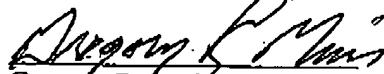
Since Tai does not teach or suggest the combination of the features in claim 45, claim 45, as well as claims 46 to 71 are patentable over Tai. Reconsideration and withdrawal of the rejection are respectfully requested.

New claims 98 to 106 are presented herein. Of the new claims, claim 98 is in independent form. It is respectfully submitted that claim 98 is patentable over Tai.

Claim 98 expressly recites, among other features, a step of providing a first discrete amount of spontaneous vapor phase etchant recipe comprising vapor phase xenon difluoride into the etching chamber during a first feeding cycle of a sequence of feeding cycles for removing the sacrificial material. This feature is nowhere disclosed or suggested by Tai. Tai discussed xenon difluoride in the specification, for example, in line 62 column 2 to line 11 column 3. Tai expressly teaches away from xenon difluoride due to the fact that: 1) Tai states "when compared with xenon difluoride (XeF₂), bromine trifluoride is easier to vaporize"; 2) Tai states that BrF₃ is easier to store than XeF₂; 3) Tai states that "BrF₃ has more fluorine atoms than XeF₂ per molecular. Hence BrF₃ has a higher etching efficiency than that of XeF₂"; and 4) Tai states that "BrF₃ is also cost effective when compared with the use of XeF₂." Thus, though Tai mentions XeF₂, it is in the context of explaining why BrF₃ should be used instead of XeF₂. Therefore, it is respectfully submit that claim 98, as well as claims 99 to 106 dependent from claim 98, is patentable over Tai.

It is believed that this application is in condition for allowance. Favorable consideration and prompt allowance are respectfully requested. In the event any fees are required in connection with this paper, please charge our Deposit Account No. 501516.

Respectfully submitted,


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